Chem I Formula Sheet

Moles and Stoichiometry

1 mole = 6.02×10^{23} representative particles = 22.4 liters (gas at STP) = molar mass

percent yield = $\frac{\text{actual yield}}{\text{theoretical yield}} \times 100$ 1000 g = 1 kg

Gas Unit Conversions and Laws

Celsius + 273 = Kelvin STP = 0°C and 1atm

1 atm = 760 mmHg = 760 torr = 101.3 kPa = 14.7 psi 1 Liter = 1000 milliliters

1 milliliter = 1 cm^3 $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

$PV = nRT$ where $R = 0.0821 \frac{atm*L}{mol*K}$

Solutions

Molarity = M = $\frac{\text{moles solute}}{\text{Liters of solution}}$ molality = m = $\frac{\text{moles solute}}{\text{kilograms of solvent}}$

% by mass = $\frac{\text{grams of solute}}{\text{total grams of solution}} \times 100$ $M_1V_1 = M_2V_2$

$\Delta T_{fp} = (K_f)$ (molality) (# solute particles in solution) for water: $K_f = 1.86\ ^\circ C/m$

$\Delta T_{bp} = (K_b)$ (molality) (# solute particles in solution) $K_b = 0.52^\circ C/m$

Acids and Bases

$pH = -\log [H^+]$ $[H^+] = 10^{-pH}$

$pOH = -\log [OH^-]$ $[OH^-] = 10^{-pOH}$

$[H^+][OH^-] = 1.0 \times 10^{-14}$ $pH + pOH = 14$

(# H^+ ions) $M_aV_a = M_bV_b$ (# OH^- ions)

Geometry	Shape of Molecule
Linear	
Trigonal Planar	
Bent	
Tetrahedral	
Trigonal Pyramidal	
Bent